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10/571,869	01/19/2007	Johann Riegel	10191/4215	6930

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EXAMINER	
DINH, BACH T	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/571,869	RIEGEL ET AL.	
	Examiner	Art Unit	
	BACH T. DINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2011*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10 and 12-23* is/are pending in the application.

4a) Of the above claim(s) *12-14 and 19-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10,15-18 and 21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the response to the communication filed on 02/15/2011.

2. Claims 10 and 12-23 are currently pending.

3. Claims 12-14 and 19-20 are withdrawn from consideration.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 10, 15-18 and 21-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is made in light of Applicant's election of species B as depicted in figures 3-5 and claimed in claims 10, 15-18 and 21-22. Claim 10 recites "wherein the sensor element does not include a measuring chamber"; however, the element 23 of figures 3-4 is the structural equivalence of a measuring chamber for the following reasons.

   a. Firstly, the originally filed specification explicitly stated that "the absence of a measuring chamber or cavity permits the gas inlet bore hole to be omitted" (page 2 lines 26-29); whereas, figures 3-5 of the elected species B clearly shows the inlet bore hole 24, which allows gas to diffuse to the measuring chamber 23.

b. Secondly, Pub. No. US 2005/0043899, which has a common inventor, Lothar Diehl, as that of current application, discloses a gas sensor (figure 1) comprises a "measuring chamber 18" and exhaust gas 12 reaches the actual measuring chamber 18 of a Nernst cell 20 through a small orifice 14 [0019]. Comparing the "clearance" 23 and the orifice 24 in figure 3 of current application to the measuring chamber 18 and the orifice 14 of Pub. No. US 2005/0043899, one could readily see that they are the same structure. Thus, the evidence provided by Pub. No. US 2005/0043899, which has a common inventor as that of current application, shows that the element 23 labeled as "clearance" is in fact the measuring chamber as readily known in the art.

c. For the reasons stated above, claims 10, 15-18 and 21-22, which are elected as being drawn to species B, are not supported by the originally filed specification because the figures 3-5 of species B shows the measuring chamber 23.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 15-18 and 21-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is made in light of Applicant's election of species B as depicted in figures 3-5 and claimed in claims 10, 15-18 and 21-22. Applicant labels element 23 as a "clearance"; however, the originally filed specification discloses "the absence of a measuring chamber or cavity permits the gas inlet bore hole to be omitted" (page 2 lines 26-29); whereas, figures 3-5 of the elected

species B clearly shows the inlet bore hole 24, which allows gas to diffuse to the measuring chamber 23. Furthermore, Pub. No. US 2005/0043899, which has a common inventor, Lothar Diehl, as that of current application, discloses a gas sensor (figure 1) comprises a "measuring chamber 18" and exhaust gas 12 reaches the actual measuring chamber 18 of a Nernst cell 20 through a small orifice 14 [0019]. Comparing the "clearance" 23 and the orifice 24 in figure 3 of current application to the measuring chamber 18 and the orifice 14 of Pub. No. US 2005/0043899, one could readily see that they are the same structure. Thus, the evidence provided by Pub. No. US 2005/0043899, which has a common inventor as that of current application, shows that the element 23 labeled as "clearance" is in fact the measuring chamber as readily known in the art. Therefore, contrary to the limitation "wherein the sensor element does not include a measuring chamber", the element 23 of the elected species is in fact the measuring chamber. Thus, claims 10, 15-18 and 21-22 are indefinite for claim 10 excludes an essential element of the elected species; namely, the element 23 as the measuring chamber. Furthermore, the claims are indefinite because it appears that Applicant's position is the clearance 23 is structurally different than the measuring chamber; however, such position contradicts the disclosure of the originally filed specification and the evidence from the prior art. Additionally, it is unclear as to which structure would constitute a "clearance" and which structure would constitute a "measuring chamber". Moreover, Applicant is invited to structurally differentiate the element 23 labeled as a "clearance" to the measuring chamber as known in the art as evidenced by Pub. No. US 2005/0043899.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 10, 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheer et al. (WO 03/036281) with equivalent English translation provided by Scheer et al. (US 2005/0034986) in view of Kondo et al. (US 4,472,262) and Harada et al. (US 4,915,814) with further evidence provided by Diehl (US 2003/0116433).

Addressing claims 1 and 23, Scheer discloses a sensor element (figure 1) for a gas sensor for determining a concentration of a gas component in a gas mixture (Abstract), comprising:

A pair of electrodes including a first electrode 42 and a second electrode 41;

A solid electrolyte (layers 21-23) that forms, together with the first and second electrodes, a pump cell for the gas component [0023];

A reference electrode 43 provided on the solid electrolyte and exposed to a reference gas ([0022-0023], the reference electrode 43 is disposed in the reference gas region 32);

A porous protective layer 34 for the first electrode,

Wherein the first electrode 42 is exposed to the gas mixture via the porous protective layer 34 (figure 1, gas enters through the opening 36 has to pass through the protective layer 34 before reaching the first electrode 42),

Wherein the first electrode 42 forms, together with the reference electrode 43 and the solid electrolyte 21, a concentration cell [0024],

A porous diffusion layer 45 coated on a surface of the second electrode 41 facing away from the solid electrolyte,

Wherein the porous diffusion layer 45 is directly exposed to the gas mixture (figure 1)

Wherein the sensor element does not include a measuring chamber (Scheer does not disclose a measuring chamber; therefore, the sensor element of Scheer does not include a measuring chamber);

With regard to the limitation "wherein the second electrode is configured as a reference electrode of the concentration cell", which is drawn to the function of the second electrode, the MPEP states "while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function" and "a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be

employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim" (MPEP 2114). In instant situation, Scheer discloses all three of the claimed electrodes; therefore, Scheer discloses all the structural limitations of the electrodes of the claim. Hence, the manner in which the second electrode is intended to be employed does not differentiate the claimed second electrode from that of Scheer. Moreover, Diehl discloses a gas sensor comprises electrodes 16 and 17 sandwiching a solid electrolyte layer 12 like electrodes 41 and 42 sandwiching the solid electrolyte layer 21 as disclosed by Scheer. Furthermore, Diehl discloses the electrodes 16 and 17 are structurally capable of functioning as a pump cell or Nernst cell [0008], during which the voltage is measured between the electrodes 16 and 17. Thus, the evidence provided by Diehl shows that the second electrode 42 of Scheer is structurally capable of functioning as a reference electrode of the Nernst or concentration cell.

Scheer is silent regarding the porous protective layer 34 is a coarsely porous diffusion layer and the porous diffusion layer 45 is a finely porous diffusion layer.

Kondo discloses a gas sensor comprises the electrodes 1d and 1b sandwiching a solid electrolyte layer 1a for measuring the current that is indicative of the oxygen concentration (figures 1A-1B) similar to the electrodes 41 and 42 sandwiching the solid electrolyte layer for measuring the current that is indicative of the oxygen concentration ([0023], the electrodes 41 and 42 form the pump cell, which measures the concentration of oxygen in term of the output current [0005]) as disclosed by Scheer. Furthermore, the porous diffusion layer 1e that covers the upper electrode 1b has larger gas permeability

than the porous diffusion layer 1f that covers the lower electrode 1e (col. 5 lines 2-12 or 5:2-12).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the gas sensor of Scheer by modifying the porous diffusion layer 34 to have higher gas permeability than the porous diffusion layer 45 as disclosed by Kondo for the layers 1e and 1f, respectively because by having higher gas permeability, the porous diffusion layer 34 allows oxygen gas to drain from the solid electrolyte layer through the electrode 42 and the porous diffusion layer 45 controls the quantity of oxygen gas diffuses to the solid electrolyte layer from the electrode 41 (Kondo, 5:3-12).

Harada discloses a gas sensor; wherein, the porous diffusion layer, which is made with particles with large mean particle size, has larger pores size then the porous diffusion layer made with particles with small mean particle size (5:37-45).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the porous diffusion layers of Scheer in view of Kondo by forming the porous diffusion layer 34, which has higher gas permeability, with particles with large mean particle size and the porous diffusion layer 45, which has smaller gas permeability, with particles having small mean particle size as disclosed by Harada because the porous diffusion layer 34, that has the particles having large mean particle size, would have large pore size and higher gas permeability than the porous diffusion layer 45 that has the particles having small mean particle size according to the relationship between mean particle size and the pores size disclosed by Harada (5:37-45). Therefore, the porous diffusion layer 45 made with particles with small mean particle size is the finely porous

diffusion layer and the porous diffusion layer 34 made with particles with large mean particle size is the coarsely porous diffusion layer.

Addressing claim 15, in figure 1, Scheer further discloses a solid electrolyte body that includes a first solid electrolyte layer 21 and a second solid electrolyte layer 22, and wherein the first electrode 42 and the second electrode 41 are situated on vertically opposite sides of the first solid electrolyte layer 21, the first solid electrolyte layer being positioned relative to the second solid electrolyte layer 22 in such a way that a clearance 31 exists between the second solid electrolyte layer 22 and the finely porous diffusion layer 45 coated on the surface of the second electrode 41, and the clearance 31 being exposed to the gas mixture via a gas supply orifice 36 that extends through the first solid electrolyte layer 21.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scheer et al. (WO 03/036281) with equivalent English translation provided by Scheer et al. (US 2005/0034986) in view of Kondo et al. (US 4,472,262) and Harada et al. (US 4,915,814) with further evidence provided by Diehl (US 2003/0116433) as applied to claims 10, 15 and 23 above, and further in view of Fukuda et al. (US 4,808,293).

Addressing claims 16-17, Scheer discloses the first solid electrolyte layer 21 is supported by layer 35 on the second solid electrolyte layer 22 in the area of the clearance 31. Scheer is silent regarding the layer 35 is a radial web.

Fukuda discloses a gas sensor comprises a layer 2 in form of a radial web for supporting the top layer 3 and is disposed on the solid electrolyte layer 1 (figures 3-4).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the solid electrolyte layer 22 of Heimann with the radial web section as disclosed by Fukuda because the radial web portion would increase the diffusion flow resistance; thereby, allowing the oxygen sensor to operate at a lower temperature (Fukuda, 4:21-25).

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scheer et al. (WO 03/036281) with equivalent English translation provided by Scheer et al. (US 2005/0034986) in view of Kondo et al. (US 4,472,262), Harada et al. (US 4,915,814) and Fukuda et al. (US 4,808,293) with further evidence provided by Diehl (US 2003/0116433) as applied to claim 16 above, and further in view of Heimann et al. (US 2004/0040846).

Addressing claim 17, Scheer is silent regarding the layer 35 is a solid electrolyte.

Heimann discloses a gas sensor comprises a solid electrolyte layer 22 on the solid electrolyte layer 23 for supporting the solid electrolyte layer 21 (figure 1).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the layer 35 of Scheer with the solid electrolyte material as disclosed by Heimann because the simple substitution of the known solid electrolyte material 22 for the sealing layer 35 in order to obtain the predictable result of supporting another solid electrolyte layer is a matter of obviousness (please see KSR decision, MPEP 2141, Rationale B).

12. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheer et al. (WO 03/036281) with equivalent English translation provided by Scheer et al. (US 2005/0034986) in view of Kondo et al. (US 4,472,262) and Harada et al. (US 4,915,814) with further evidence provided by Diehl (US 2003/0116433) as applied to claims 10 and 15 above, and further in view of Mase et al. (US 4,755,274).

Addressing claims 18 and 21, Scheer, Kondo and Harada are silent regarding the finely porous diffusion layer is made up of a plurality of superposed diffusion layers of different porosities.

Mase discloses a porous diffusion layer (108b and 108a) covering an electrode (figure 21); wherein, the porous diffusion layer comprises a plurality of layers with different porosities (16:58-61).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the finely porous diffusion layer of Scheer in view of Kondo and Harada with a plurality of superposed diffusion layers of different porosities as disclosed by Mase because the multiple superposed diffusion layers would increase the sharpness of detection of a variation in output or reducing the tendency of plugging or clogging (Mase, 15:52-16:5).

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scheer et al. (WO 03/036281) with equivalent English translation provided by Scheer et al. (US 2005/0034986) in view of Kondo et al. (US 4,472,262), Harada et al. (US 4,915,814) and Fukuda et al. (US

4,808,293) with further evidence provided by Diehl (US 2003/0116433) as applied to claim 16 above, and further in view of Mase et al. (US 4,755,274).

Addressing claim 22, Scheer, Kondo, Fukuda and Harada are silent regarding the finely porous diffusion layer is made up of a plurality of superposed diffusion layers of different porosities.

Mase discloses a porous diffusion layer (108b and 108a) covering an electrode (figure 21); wherein, the porous diffusion layer comprises a plurality of layers with different porosities (16:58-61).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the finely porous diffusion layer of Scheer in view of Kondo, Fukuda and Harada with a plurality of superposed diffusion layers of different porosities as disclosed by Mase because the multiple superposed diffusion layers would increase the sharpness of detection of a variation in output or reducing the tendency of plugging or clogging (Mase, 15:52-16:5).

Response to Arguments

14. Applicant's arguments filed 02/15/2011 with regard to the notice of non-responsive amendment have been fully considered. Even though the notice of non-responsive amendment is withdrawn, Examiner believes that Applicant's arguments regarding the notice of non-responsive amendment is pertinent to the 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement stated above. The arguments are not persuasive for the following reasons.

d. Firstly, Applicant argued "while the absence of a measuring chamber or cavity may permit the gas inlet bore to be omitted, it does not follow that if a gas inlet bore is present (which Applicants do not necessarily conceded in this case), then a measuring chamber must be present. If "A" then "B", does not mean that if "B" then "A"". However, the originally filed specification never contemplates an inlet without a measuring chamber. Furthermore, if an inlet bore is presence but the measuring chamber is absence, where would the exhaust gas go after the exhaust gas pass through the inlet bore? Likewise, if the measuring chamber is presence but the inlet bore is absence, how would the exhaust gas get to the measuring chamber? Examiner acknowledges Applicant's reasoning; however, such reasoning is not applicable to the gas sensor of current application.

e. Secondly, Applicant argued that "element 23 is a clearance between the diffusion layers and the second solid electrolyte layer 213. While the clearance may be filled with a gas mixture via a gas supply orifice 24, that does not necessarily make it a "measuring" chamber"". The argument is not persuasive because the originally filed specification explicitly discloses that "In either case, it is made sure that sufficient clearance 23 remains between the diffusion layers 19, 18 and the surface of second solid electrolyte layer 213, **this clearance always being filled with the gas mixture, i.e., the exhaust gas, via a gas supply orifice 24** in first solid electrolyte layer 211" (emphasis added). Thus, contrary to Applicant's assertion that the clearance may be filled with the gas mixture, the originally filed specification clearly discloses that the "clearance" is always filled with the exhaust gas via the orifice 24, which is the same function as the measuring

chamber. Therefore, Examiner contends that the "clearance" is the measuring chamber as readily known by one of ordinary skill in the art of gas sensor. Moreover, Pub. No. US 2005/0043899, which has a common inventor, Lothar Diehl, as that of current application, discloses a gas sensor (figure 1) comprises a "measuring chamber 18" and exhaust gas 12 reaches the actual measuring chamber 18 of a Nernst cell 20 through a small orifice 14 [0019]. Comparing the "clearance" 23 and the orifice 24 in figure 3 of current application to the measuring chamber 18 and the orifice 14 of Pub. No. US 2005/0043899, one could readily see that they are the same structure. Thus, the evidence provided by Pub. No. US 2005/0043899, which has a common inventor as that of current application, shows that the element 23 labeled as "clearance" is in fact the measuring chamber.

f. For the reasons stated above, Examiner maintains the position that the element 23 labeled as "clearance" is the measuring chamber as readily known in the art.

15. With regard to Applicant's arguments regarding the art rejection, the arguments are moot in view of the new ground of rejection as necessitated by Applicant's amendment to the claims as stated above.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BD
04/21/2011

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